# Giant Hemangiomas of the Liver



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IN a period of 30 years, 22 giant hepatic hemangiomas were treated by the surgical staff of the Memorial Sloan-Kettering Cancer Center. Although, hemangioma is the most frequent benign tumor of the liver, large vascular mesodermal tumors with clinical manifestations are rare. Because of the relative infrequency of large symptomatic hepatic hemangiomas, mostly isolated case reports and collective reviews appeared in the literature. In 1942, Shumacker[7] reviewed the world literature and found 67 cases including one of his own, of which 56 operations had been performed. In 1952, Wilson and Tyson[9] collected 17 more surgically treated large hepatic hemangiomas. Henson, Gray and Dockerty[8] reported the experience of the Mayo Clinic in 1956 which included 35 patients with hemangiomas of the liver.

Our study revealed that a total of 126 patients with benign tumors of the liver were treated between January 1935 through December 1965 at Memorial Hospital (Table 1). One hundred and six were hemangiomas, including 22 vascular tumors of massive size.

## Materials and Methods

A retrospective study of patients diagnosed as having hepatic hemangiomas at this institution from January 1935 to December 1965 was carried out. The case records and pathologic slides of these patients were reviewed. One hundred and six patients were divided into two groups; those with small solitary or multiple hemangiomas less than 4 cm. in diameter, and those with massive or giant hemangiomas measuring more than 4 cm. in diameter. Four centimeter was selected for division, because no symptomatic tumor was encountered which was less than this size. Twenty small solitary and 64 multiple small hemangiomas were discovered incidentally at laparotomy. There were 22 patients with massive or giant hemangiomas, and this review is based on this experience.

## Results

Of the 22 patients with "giant" hemangiomas of the liver, there were 12 females and 10 males. Ages of the patients varied from four months to 77 years with an average age of 51 years. Eighteen patients had symptoms, and in four the hemangiomas were discovered at laparotomy for other conditions. The average duration of symptoms was 4.1 years, the longest being ten years.

The chief complaint was a self detected upper abdominal mass in eight patients, epigastric and right upper quadrant pain and discomfort in four, and diffuse abdominal distention in four. In one instance, the patient had hypotension, a rapidly enlarging right upper quadrant mass with diffuse peritoneal irritation as the result of

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TABLE 1. *Benign Liver Tumors—1935–1965 Memorial Hospital*

| | |
|---|---|
| Hemangioma | 106 |
| Lymphangioma | 1 |
| Adenomas: | |
| Hepatic cell | 4 |
| Bile duct | 2 |
| Hamartoma | 9 |
| Cyst, solitary | 3 |
| Lipoma | 1 |
| Total | 126 |

spontaneous rupture of the tumor. Another patient was transferred from another institution with continuous bleeding following common bile duct exploration and incisional biopsy of a large hemangioma of the right lobe.

On physical examination an epigastric or right upper quadrant mass was palpable in 12 patients. The mass was tender in two. Diffuse abdominal enlargement was noted in three patients. On the extremities and on the trunk of one patient scattered cutaneous hemangiomas were present.

Laboratory tests including platelet count and liver function tests were normal in all but one patient who had concomitant common duct stones. Plain x-ray films of the abdomen disclosed small focal calcifications in one, and a 25 cm. × 20 cm. diffusely calcified mass in the right upper quadrant of another patient. Barium contrast x-rays showed extrinsic pressure and displacement of the stomach in two patients, and colonic displacement downward and anteriorly in one. In one instance a rose bengal liver scan showed a space-occupying lesion in the right lobe.

In 13 patients the tumors were located in the right lobe of the liver; in three the left lobe, and in six both hepatic lobes were involved. Both right and left lobes were diffusely replaced in four out of these six patients, and in one the entire right lobe with the adjacent one third of the left lobe were affected; in another, in addition to almost total involvement of the left lobe, the undersurface of the right lobe was involved. The largest diameters of measureable hemangiomas were from 6 cm. to 45 cm. (Table 2).

Consistency varied from soft cystic to a firm solid mass. No hemangioma was completely pedunculated. Several had a lobulated appearance. Except with diffuse hemangiomatosis, liver parenchyma surrounding the lesion was compressed by a fibrous capsule composing the wall of the hemangioma (Fig. 1). On cross section the dark red-purple tumors appeared round or wedge-shaped, featuring a honeycomb pattern (Fig. 2). The largest distinct tumor mass which occupied the entire right lobe and almost completely filled the abdominal cavity measured 45 cm. × 25 cm. × 25 cm.

Microscopically all resected hemangiomas were of the cavernous variety featuring dilated blood spaces, often with papillary infoldings of the walls (Fig. 3). These large irregularly outlined, mostly blood-filled channels were lined by flattened endothelial cells and were divided by fibrous connective septa. Lipid laden phagocytes, in addition to lymphocytes were seen within the stromal trabeculae, and the endothelial lined vascular spaces were sometimes supported by elongated smooth muscle cells. The composition of the walls of these vascular channels imitated that of arterial or venous structures (Fig. 4).

In ten of 22 patients the tumors were resected entirely. This required right hepatic lobectomy in three patients, and left lobectomy in one. The tumors were removed by wedge resections of the corresponding lobes in six patients. In four the lesions were biopsied with no further treatment. Eight patients underwent laparotomies, and seven out of the eight were treated by postoperative irradiation, consisting of 1,500 to 2,500 rads tumor dose to the right upper quadrant and epigastrium. Of the eight patients treated with radiation therapy, four had diffuse involvement of both lobes.

TABLE 2. *"Giant" Hemangiomas of the Liver Treated at Memorial Hospital between 1955–1965*

| No. | Sex | Age | Symptoms | Physical findings | Tumor size (cm.) | Location | Treatment | Follow-up (yrs.) |
|---|---|---|---|---|---|---|---|---|
| 1 | F | 37 | Epigastric pain | Epigastric mass | 25 × 15 × 11 | Rt. lobe | Wedge excision | 18 |
| 2 | F | 48 | Epigastric discomfort | Epigastric Lt. upper quadrant mass | 25 × 25 × 30 | Both lobes | Expl. laparotomy 1500 r postop | 9 |
| 3 | F | 47 | Abdominal distension | Abdominal distension | 6 × 6 × 5 | Rt. lobe | Expl. laparotomy | Lost to follow-up |
| 4 | M | 60 | Epigastric discomfort and mass | Rt. upper quad. mass | 11 × 12 × 12 | Rt. lobe | Expl. laparotomy 2000 r postop | 3 |
| 5 | M | 39 | None | None | 6 × 4 × 4 | Rt. lobe | Expl. laparotomy biopsy | 2 |
| 6 | M | 72 | Rt. upper quad. mass | Rt. upper quad. mass | 15 × 15 × 10 | Rt. lobe | Expl. laparotomy wedge excision | 6 |
| 7 | F | 40 | None | None | 9 × 7 × 7 | Rt. lobe | Expl. laparotomy wedge excision | 4 |
| 8 | F | 62 | Epigastric mass | Epigastric mass | 20 × 14 × 10 | Rt. lobe | Rt. hepatic lobectomy | 12 |
| 9 | F | 60 | Diffuse abd. enlargement and pain | Abdominal distension | Diffuse | Both lobes | Expl. laparotomy 2500 r postop | 5 |
| 10 | M | 60 | Bleeding from drain site Epigastric pain | Rt. upper quad. mass | 15 × 20 × 10 | Rt. lobe | Rt. hepatic lobectomy | Exp. |
| 11 | M | 62 | Epigastric mass | Epigastric mass | 15 × 12 × 10 | Lt. lobe | Lt. hepatic lobectomy | 4 |
| 12 | M | 53 | Mass in Rt. upper quad. | Rt. upper quad. mass | Diffuse | Rt. lobe and adjacent ¼ of Lt. lobe | Expl. laparotomy biopsy | Lost to follow-up |
| 13 | M | 77 | None | None | 20 × 12 × 6 | Lt. lobe | Expl. laparotomy biopsy | Lost to follow-up |
| 14 | M | 55 | Epigastric mass | Epigastric Lt. upper quad. mass | Diffuse | Lt. lobe and undersurface-rt. lobe | Expl. laparotomy 2500 r postop | 25 |
| 15 | F | 26 | Abdominal distension | Abdominal distension | 6 × 8 × 6 | Rt. lobe | Wedge resection | 6 |
| 16 | F | 61 | Epigastric pain | Some Rt. upper quad. tenderness | 12 × 12 × 10 | Rt. lobe | Wedge resection | 8 |
| 17 | M | 48 | Large abdominal mass | Same | 45 × 25 × 25 | Rt. lobe | Expl. laparotomy 1500 r postop | 12 |
| 18 | M | 50 | None | None | 12 × 12 × 10 | Rt. lobe | Expl. laparotomy biopsy | 4 |
| 19 | F | 51 | Epigastric pain | None | Diffuse | Both lobes | Expl. laparotomy 2000 r postop | Lost to follow-up |
| 20 | F | 46 | Enlarging abd. mass severe pain | Shock Rt. upper quad. mass peritonitis | 25 × 14 × 12 | Rt. lobe | Rt. hepatic lobectomy | Exp. |
| 21 | M | 4 mos. | Enlarged abdomen | Abdominal distension Cutaneous hemangiomas | Diffuse | Both lobes | Expl. laparotomy 1500 r postop | 8 |
| 22 | F | 48 | Epigastric pain | Rt. upper quad. mass | 10 × 12 × 8 | Lt. lobe | Expl. laparotomy wedge resection | 5 |

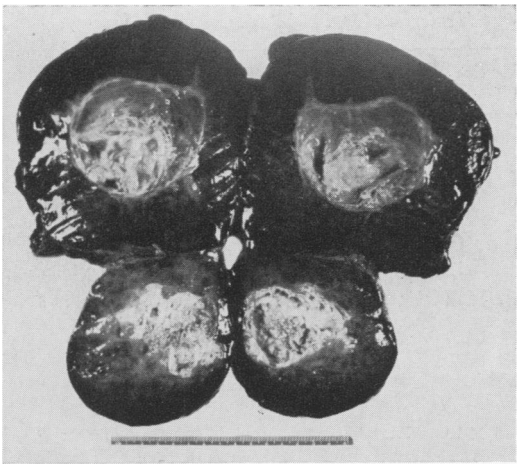

FIG. 1. Cross section of a hemangioma composed of two fairly well defined vascular tumors with the intervening liver substance being replaced by myxoid spongy tissue and dilated blood spaces.

The four patients in whom massive hemangiomas were incidentally discovered, underwent laparotomy for the following reasons: mechanical small bowel obstruction, recurrent abdominal desmoid, choledocholithiasis with chronic pancreatitis and metastatic epidermoid carcinoma of the bladder.

There were two deaths, both following emergency hepatic resections. A 46-year-old woman was admitted with unobtainable blood pressure, rapidly enlarging upper abdominal mass and peritoneal signs. The presence of a massive hemangioma in the right lobe of the liver was known from a previous operation elsewhere. At laparotomy a 22 cm. × 14 cm. × 12 cm. hemangioma which ruptured into the peritoneal cavity was found. Right hepatic lobectomy was carried out and a large retroperitoneal hematoma was evacuated. The patient died 12 hours following operation as a result of uncontrollable bleeding. The second fatal complication occurred in a 60-year-old woman who was transferred to Memorial Hospital with continuous severe postoperative bleeding following cholecystectomy, common bile duct exploration and incisional biopsy of a large hemangioma of the right hepatic lobe 48 hours earlier. At emergency laparotomy a 15 cm. × 20 cm. × 10 cm. profusely bleeding hemangioma was found. Right hepatic lobectomy was performed. Postoperatively the patient developed bronchopneumonia, gram negative sepsis complicated by renal failure and died 6 days after operation.

The postoperative courses of patients following elective resections were uncomplicated except for one, in whom a bile collection in the subhepatic space required drainage. Subsequent recovery of this patient was uneventful.

Four patients were lost to follow-up, three of whom had only laparotomy and one received radiation therapy following exploratory operation.

The follow-up period ranged from two to 25 years. Of ten patients who underwent resections, two died in the early postoperative course. The remaining eight patients did well and on periodic follow-up to date had no evidence of recurrent disease, and are asymptomatic. Of seven patients treated with irradiation following laparotomy, one

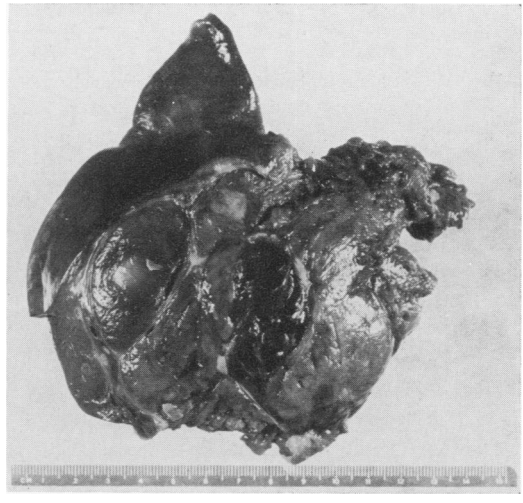

FIG. 2. Large, partly cystic hemangioma occupying almost completely the left liver lobe. The lobulated architecture and wide fibrous septums clearly visible.

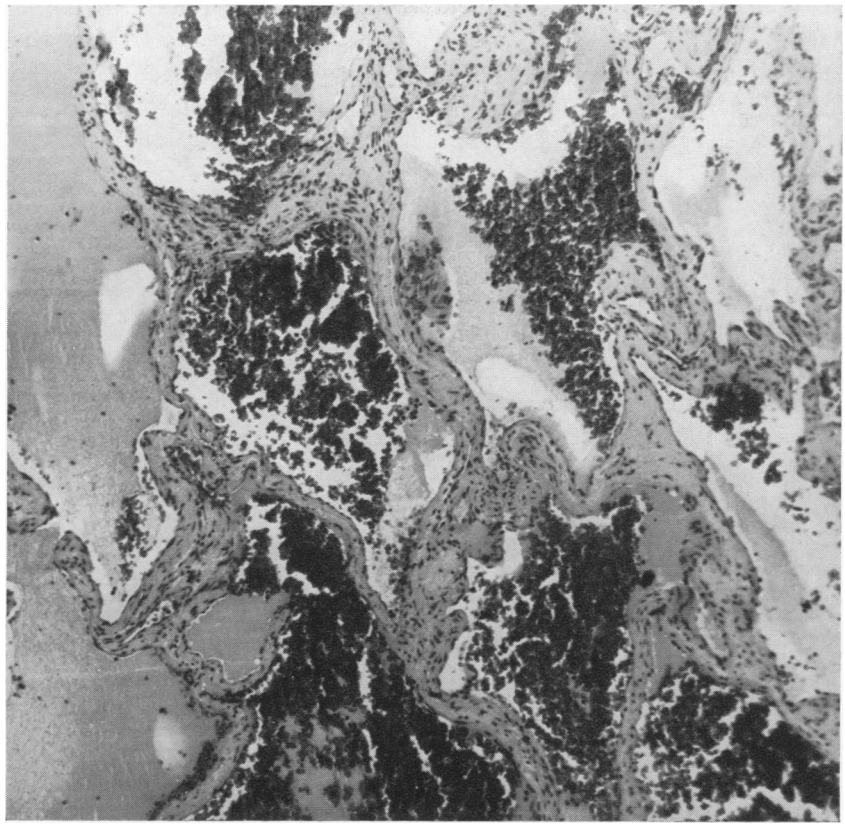

FIG. 3. Hemangioma of liver. Markedly dilated venous blood channels with erythrocytes in their lumina. × 430 magnification.

was lost to follow-up. The remaining six had no progression of the disease although three were not completely relieved of symptoms. In two the tumor decreased in size following radiation therapy. Of five patients who had laparotomies only, three were lost to follow-up, one died from metastatic epidermoid carcinoma of the bladder, and in one the lesion has remained asymptomatic for 2 years.

## Discussion

Vascular tumors of the liver are uncommon: most are discovered incidentally at the time of laparotomy or autopsy. Despite the fact, that hemangiomas occur more commonly in the liver than in any other internal organ, symptomatic massive hepatic hemangiomas are rare. Of 106 patients with hemangiomas, only 18 sought medical attention for complaints related to the massive hemangioma. Symptoms were directly related to the size of the tumor and to pressure on adjacent organs and were non-specific. Frequently an abdominal mass was detected by the patient and physical findings confirmed the presence of a tumor which was occasionally tender. Further laboratory and radiological investigations were non-diagnostic. The correct diagnosis seldom was made before operation. Celiac angiography was not utilized in this series.

Sewell and Weiss [6] collected 12 cases of spontaneous rupture of tumors with a mortality of 75%. The tendency of large cavernous hemangiomas in newborn infants to rupture is recognized and are regarded by Clatworthy and associates [1] as a surgical emergency. When the massive tumor is thin walled and tense and thus predisposed

to spontaneous rupture, treatment is mandatory.

There are two main treatment modalitites: surgical resection or radiation therapy. Some hemangiomas are initially embedded in liver substance in early stages of development, but as they enlarge a pedicle of variable widths may develop, through which the tumor receives its blood supply. In such a case, surgical excision is simple. Wedge excision through normal liver parenchyma can be accomplished without technical difficulties. Large hemangiomas embedded in liver substance or replacing an hepatic lobe, can be extirpated by planned hepatic lobectomy. For symptomatic giant hemangiomas confined to one lobe, the treatment of choice is resection.

Cripps,[2] M'Weeney[4] and others point out that aspiration or biopsy of these vascular tumors is hazardous and might initiate uncontrollable hemorrhage. One fatal complication in this series occurred when open biopsy required emergency right hepatic lobectomy to control hemorrhage.

Spontaneous rupture of a large hemangioma carries a poor prognosis. To control bleeding from a ruptured tumor is difficult. Tinker[8] in 1935 reported the first successful resection of a ruptured hemangioma. Of reports in the literature, only four other patients survived.[6] Spontaneous rupture accounted for the second fatal postoperative complication following emergency right hepatic lobectomy in the presently reported series.

The alternative treatment is radiation therapy. Success of treatment by irradiation is not disappearance of the tumor, but arrest of growth and relief of symptoms. In

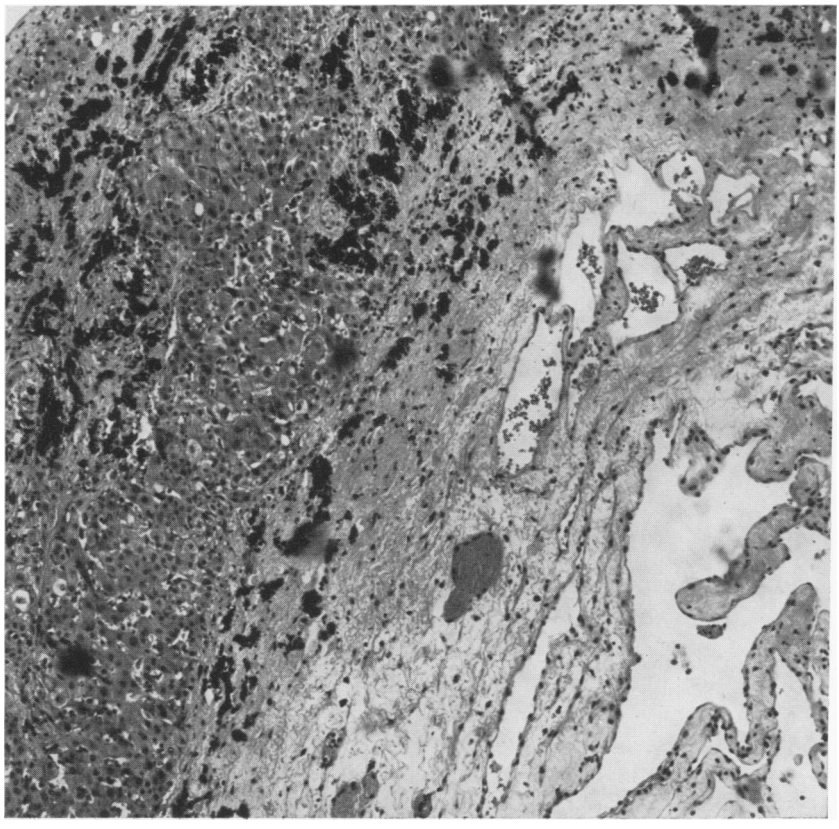

FIG. 4. Hemangioma of liver with vascular channels and myxoid tissue in its wall. Note fibrous tissue capsule and hemosiolerin desposition in hepatic parenchyma. ×200 magnification.

instances where both liver lobes are diffusely involved, radiation therapy is preferable. This is also the method for patients in whom operation of this magnitude is contraindicated. In this series, seven patients were treated by postoperative irradiation, including four with diffuse bilobar hemangiomatosis, one in whom in addition to involvement of the left lobe the undersurface of the right lobe was involved and patients in whom resection was unwarranted. Although late complications did not develop in any patient treated by irradiation, relief of symptoms was only partial in three. The role of radiation therapy in management of hepatic hemangiomas at this institution was reported by Park and Phillips.[5]

Patients who have undergone elective resections have done well. Postoperative recovery was rapid with but one major complication. Two patients who died had emergency operations for bleeding.

## Summary

One hundred and six patients with hemangiomas of the liver were seen during the years 1935 through 1965 at Memorial Hospital for Cancer and Allied Diseases. Twenty-two of these tumors were of massive size. Neither symptoms, physical findings nor laboratory investigations were helpful in establishing the correct diagnosis. Massive bleeding, due to spontaneous rupture in one patient and following incisional biopsy in another occurred. In ten of 22 patients, the tumors were resectable; seven patients received irradiation therapy following laparotomy, and five patients underwent exploratory operation only. Two patients died following emergency hepatic resections for massive hemorrhage. There was no mortality from elective hepatic resections. It is suggested that symptomatic giant hemangiomas of the liver confined to one lobe, be treated by surgical resection. When both hepatic lobes are diffusely involved or when there are contraindication to operation, irradiation is the treatment of choice.

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